

CLAIMS

1. A method for diagnosing functional faults of a functional architecture composed of a set of functions associated with electronic components ( $A_i^n$ ;  $C_i^n$ ; UCE<sub>n</sub>; B) that produce and consume data, at least one of the said data ( $x_i$ ) being able to assume a predetermined particular value ( $x_{ip}$ ) following the development of a functional fault of at least one of the components ( $A_i^n$ ;  $C_i^n$ ; UCE<sub>n</sub>; B) of the said set, this method being characterized in that, given a set of functions that performs a service, wherein the input and output data can be associated with sensors or actuators, it includes:

- i) a step of determination of particular values, in the course of which there are listed the particular values corresponding to functional faults of the sensors and actuators,
- ii) a step of determination of propagation, in the course of which there are listed the particular values that permit propagation of the information stream relating to these defects across the said functions,
- iii) a step of diagnosis, in the course of which there is formed the functional diagnosis of the said service as a function of the lists obtained from the determination steps, and
- iv) a step of recording of the particular values and of their propagation on a memory device for a tool provided for validation of the said architecture.

2. A diagnostic method according to claim 1, characterized in that, after the functional diagnosis step (iii), given the choice of an embodiment manifested by

- a hardware architecture composed of calculators, networks, signal lines and connectors,
- and the mapping of functions onto the said hardware

architecture,

the particular values are listed according to the method of claim 1, in order to deduce an operational diagnosis of the resulting electronic architecture.

3. A diagnostic method according to claim 1 or 2, characterized in that the particular values are classified after mapping of the functions onto the said hardware architecture.

4. A diagnostic method according to claim 3, characterized in that the particular values are classified among at least one of the following classes:

- cut bus,
- corrupted frame,
- short circuit applied to a wire,
- wrong contact applied to a connector of a strand, sensor, actuator or calculator, and
- execution fault applied to a microcontroller.

5. A method according to claims 1 to 4, characterized in that, given an operational diagnosis for a service, the functional particular values associated with sensors, actuators and functions executing the said service having been listed for at least one data flow between two functions, or between a sensor and a function, or between a function and an actuator, for which no functional particular value is defined for the said flow, if an operational particular value is defined, then a new functional particular value is automatically determined for this flow.

6. A method according to claims 1 to 5, characterized in that

there are listed the undiagnosed feared incidents and the undiagnosable feared incidents in order to construct an analysis of the functional safety of a functional architecture.

7. A method according to claims 1 to 6, characterized in that, given the choice of an embodiment manifested by

- a hardware architecture composed of calculators, networks, signal lines and connectors,
- and the mapping of functions onto the said hardware architecture,

the particular values and feared incidents are listed according to the method of claim 6, in order to deduce an analysis of functional safety of the resulting functional architecture.

8. A diagnostic method according to any one of claims 1 to 7, characterized in that the said architecture comprises an architecture with which a vehicle can be equipped.

9. A diagnostic method according to any one of claims 1 to 8, characterized in that it includes a step of analysis of the feasibility and/or susceptibility to failure of functioning of the said architecture and of the establishment of an output indicating the said feasibility and/or susceptibility to failure.

10. A commercial article provided with a computer-readable memory, a program executable by a computer being recorded in the said memory for the diagnosis of functional faults of a functional architecture, characterized in that the said program includes encoding for:

- i) determining and listing particular values corresponding to functional faults of sensors and actuators,
- ii) determining and listing particular values permitting propagation of information relating to these faults across the said functional architecture,
- iii) forming the functional diagnosis of the said service as a function of the lists obtained from steps (i) and (ii), and
- iv) recording the said particular values and their propagation on a memory means for a tool provided for validation of the said architecture.

11. A data-processing tool programmed for the diagnosis of functional faults of a functional architecture using the steps of the method according to any one of claims 1 to 9 or programmed by using a commercial article according to claim 10.